

INSTRUCTIONS FOR SURVEY OF INDUSTRIAL RESEARCH AND DEVELOPMENT DURING 1997 FORM RD-1 L

	Page
General Instructions	2
Definition of Research and Development.	3
Item by Item Instructions.	4
Section 1 – General Company Data	4
Item 1 – Receipts and Employment for the Company.	4
Item 2 – Number of Research and Development Scientists and Engineers.	4
Item 3 – Costs Incurred for Research and Development.	4
Item 4 – Company and Other Funds, Except Federal, for Research and Development Performed Within the Company Budgeted for the Year 1998	6
Section II – Research and Development Performed Within the Domestic Company.	6
Item 5 – Costs Incurred for Federal Research and Development Performed Within the Company by Principal Government Agency	6
Item 6 – Costs Incurred for Research and Development Performed Within the Company by Major Type of Expense	6
Item 7 – Fields of Basic Research Performed Within the Company	7
Item 8 – Applied Research and Development Performed Within the Company by Product Group	7
Item 9 – Cost of Research and Development Performed Within the Company by State	10
Item 10 – Energy Research and Development Performed Within the Company	10
Item 11 – Pollution Abatement Research and Development Performed Within the Company.	10
Section III – Research and Development Performed Outside the Domestic Company With Company Funds ..	11
Item 12 – Foreign Research and Development by Country.	11
Item 13 – Coverage and Operational Status.	11
Item 14 – Certification	11

GENERAL INSTRUCTIONS

Comprehensive and timely information about the nature and support of corporate research and development activities is an important component in the overall assessment of our nation's scientific and technological resources. The information you provide is used to prepare national measures of industrial research and development (R&D) not available from any other source. By carefully completing this report, the accuracy of this information is assured.

DUE DATE – Please complete and return this form in the envelope provided within 60 days. Make a copy for your records.

SURVEY SCOPE – This report covers publicly traded and privately-owned, nonfarm business firms in all sectors of the United States economy. It does not include operations owned by Federal, state or local governments, nonprofit organizations, or trust or pension plans.

If your company is owned by a Federal, state or local government, is a nonprofit organization, or is a trust or pension plan which performs no activity other than investments, do not report. Please note in the remarks section on the back page of the form and return it.

REPORTING ENTITY – Report research and development activities for all domestic operations of your **entire consolidated domestic enterprise**, including subsidiaries and divisions. The term “company” in these instructions refers to the consolidated domestic enterprise. Report for all parts of the company located in the 50 states and the District of Columbia. Report net receipts and employment figures for all parts of the company, even those that do not perform R&D, as long as they are located in the 50 states or the District of Columbia.

If this form has been directed to a holding company, report for all subsidiaries and operations under the ownership and control of the holding company.

If you report separately for a component of this company based upon an arrangement with the Census Bureau, please continue to do so.

COVERAGE REVIEW – Check the appropriate box if this company was owned or controlled by another company on December 31, 1997. If yes, follow the instructions below:

- If you have been reporting separately for this component of the company based upon an arrangement with the Census Bureau, please complete the form.
- If your company is owned by a foreign company, please complete the form and fill out the new owner information in Item 13B, page 3.

- If your company was purchased by another company on or prior to March 31, 1997, please complete the new owner information in Item 13B, page 3, sign the form in Item 14, and fax the form to (301) 457-1318.
- If your company was purchased after March 31, 1997, please complete the form for the months prior to the purchase of your company, fill out the new owner information in Item 13B, page 3, and return the form in the envelope provided.

If you have questions, please call the R&D Survey staff at (301) 457-4677 to determine whether you are required to complete the form.

PERIOD COVERED BY THE REPORT – Report figures for calendar year 1997. Fiscal year data are acceptable for all items except for employment, provided your fiscal year ends between September 1997 and March 1998. Please report employment figures (Items 1B and 2) for the specific times indicated for these items.

HOW TO REPORT – Report all value figures in thousands of dollars. If you cannot answer a question from your company records, please estimate the answer carefully.

Example: 1,123,678,599 dollars.

	Bil.	Mil.	Thou.
Report	\$1	123	679

If you estimate your answers in millions of dollars, please fill the thousands box with zeros.

Example: 1,124

	Bil.	Mil.	Thou.
Report	\$1	124	000

FIGURES FOR 1996 PRINTED ON THE FORM – If your company reported for 1996, entries from that form have been printed on the present form. If these figures are incorrect, please revise them. Please describe in the “Remarks” section the reasons for any substantial increase or decrease in the 1997 figures entered on this form when compared to corresponding 1996 figures or changes in the 1996 figures. Examples of such reasons are new government contracts, acquisitions and divestitures, and revised accounting method. If you acquired or disposed of a unit performing an important amount of research and development during the 2-year period, please identify the unit in “Remarks,” and give the total amount of research and development accounted for by that unit.

ADDITIONAL FORMS – Photocopies of this form are acceptable. If you require additional forms, write to the Bureau of the Census, 1201 East 10th Street, Jeffersonville, IN 47132-0001 or call (812) 218-3331.

GENERAL INSTRUCTIONS – Continued

FILING EXTENSIONS – If you cannot complete the form in 60 days, request an extension of time by:

- calling the Census Touchtone Data Entry System on 1-800-851-2014 (have your IO-digit Census File Number, "CFN", available. The CFN is printed on the form above your address.)

OR

- writing to the address below (Please include your IO-digit Census File Number):

Bureau of the Census
1201 East 10th Street
Jeffersonville, IN 47132-0001

ALTERNATIVE REPORTING FORMATS – Along with the survey form, some companies received a computer diskette. Reporting your company information on the diskette is an alternative means of completing the survey. **If you do report on the diskette do not mail in the paper form.**

Receiving your data on diskette benefits us through reduced processing costs. Please refer questions concerning operation of the diskette to the Electronic Reporting Staff at (301) 457-4125.

BURDEN HOUR ESTIMATE – Public reporting burden for this collection of information is estimated to average 20 hours per response, including time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding the burden estimates or any other aspects of this collection of information, including suggestions for reducing this burden, to Gail A. McHenry, National Science Foundation, 4201 Wilson Boulevard, Room 485, Arlington, VA 22230.

Direct **QUESTIONS** regarding this form to the Bureau of the Census, Manufacturing and Construction Division, ATTN.: Special Studies Branch, Room 2135/4, Washington, DC 20233-6900, call (301) 457-1339 or E-mail to ronald.w.taylor@ccmail.census.gov. (Please see the instructions for Item 14 on page 11 for E-mail warning.)

DEFINITION OF RESEARCH AND DEVELOPMENT

R&D includes basic and applied research in the sciences and engineering. It also includes design and development of new products and processes and enhancement of existing products and processes.

R&D includes activities carried on by persons trained, either formally or by experience, in the physical sciences such as chemistry and physics, the biological sciences such as medicine, and engineering and computer science. R&D includes these activities if the purpose is to do one or more of the following things:

1. Pursue a planned search for **new knowledge**, whether or not the search has reference to a specific application. (Basic research)
2. Apply **existing knowledge** to problems involved in the **creation of a new product or process**, including work required to evaluate possible uses. (Applied research)
3. Apply **existing knowledge** to problems involved in the **improvement of a present product or process**. (Development)

Research and development includes the activities described above whether assigned to separate R&D organizational units of the company or carried out by company laboratories and technical groups not part of an R&D organization. Reporting the R&D activities of such latter groups may require the use of estimates for some of your responses,

Activities to be **excluded** from R&D:

- Routine product testing
- Geological and geophysical exploration activities

- Technical services such as:
 - quality and quantity control
 - technical plant sanitation control
 - trouble-shooting in connection with breakdowns in full-scale production
- Advertising programs to promote or demonstrate new products or processes
- Assistance in preparation of speeches and publications for persons not engaged in research and development.
- Social Science R&D which is defined to encompass those activities devoted to further understanding the behavior of groups of human beings or of individuals as members of groups. Some of the topics include the following:
 - Personnel R&D
 - Economic R&D
 - Artificial intelligence and expert systems R&D
 - Consumer, market, and opinion R&D
 - Engineering psychology R&D
 - Management and organization R&D
 - Actuarial and demographic R&D
 - Educational processes and applications R&D
 - R&D in law

ITEM BY ITEM INSTRUCTIONS

Section I – GENERAL COMPANY DATA

Item 1 – RECEIPTS AND EMPLOYMENT FOR THE COMPANY

Item 1A – Net Sales, Operating Receipts and Revenues

Include:

- Sales, operating receipts and revenues from all domestic operations of the company. This includes receipts from sales of products and services provided to other companies, individuals, U.S. Government agencies, and foreign countries.
- Net selling value of shipments, f.o.b. plant, after discounts and allowances minus freight charges and excise taxes
- Revenue from investments, rents, and royalties only if it is the principal business of the company. Finance, Insurance and Real Estate companies should include interest, dividends, commissions and rental income as part of revenues.
- Value of assets sold under a capital lease agreement
- Export transfers to your foreign subsidiaries

Exclude:

- Sales and other taxes collected and paid directly to government taxing agencies
- Domestic intra-company transfers
- Receipts from sale of products and services provided by your foreign subsidiaries
- Income from interest, dividends and commissions, except for Finance, Insurance and Real Estate companies
- Other nonoperating income (e.g., royalties)

Item 1B – Domestic Company Employment

Include:

- The number of full and part-time employees of the company as defined on Treasury Form 941, Employer's Quarterly Federal Tax Return, and Circular E, Employer's Tax Guide, if filed for the entire company.
- The number of employees in all activities in the 50 States and the District of Columbia during the pay period which includes March 12, 1997.
- Persons on paid sick leave, paid holidays, and paid vacations during the pay period which includes March 12, 1997.

Report the number of employees, not payroll.

Item 2 – NUMBER OF RESEARCH AND DEVELOPMENT SCIENTISTS AND ENGINEERS

Scientists and engineers are defined for this survey as all persons engaged in scientific or engineering work at a level which requires a knowledge of physical or life sciences or engineering or mathematics. Their experience is equivalent to completion of a 4-year college course with a major in these fields, regardless of whether or not they actually hold a degree in this field.

The figure on R&D scientists and engineers will be obtained primarily from two sources:

1. For company laboratories performing only research and development, report the number of scientists and engineers employed in January, 1998.
2. For employees whose activities are not solely devoted to R&D, report the proportion of their time that is devoted to R&D. For example, if a company had the full-time equivalent of 60 scientists and engineers in January 1998 and one-fourth of their time was charged to R&D projects, the figure for the number of R&D scientists and engineers for this company would be 15.

Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT

► Source of Funds for Research and Development Costs

Federal funds

Include:

- Federally-sponsored research and development performed within the company. Include only the amount of work done on Federal R&D contracts or subcontracts in the current year.
- R&D portion of procurement contracts or subcontracts

Exclude:

- For Item 3A exclude Federal R&D contracts and R&D portions of procurement contracts that your company subcontracted to other R&D organizations. Including these funds would cause duplication in the statistical totals, which include data on work actually performed by each company. Report subcontracted costs in Item 3B.
- Expenditures for independent research and development (IR&D). These are included in company funds. (See definition below.)

Company and other funds

Include:

- Company-sponsored research and development performed within the company and R&D performed under contract from non-Federal sources

ITEM BY ITEM INSTRUCTIONS – Continued

Item 3 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT – Continued

Company and other funds – Continued

Include:

- Costs for independent research and development (IR&D). We define IR&D funds as R&D performed by the company for which you anticipate reimbursement by the government through indirect charges for the purchase of products or services. Qualified projects usually have potential interest to the Department of Defense or other agencies of the Federal government. These IR&D funds are excluded from federal funds received for federally-sponsored research and development contracts. . .
- Costs for which you anticipate reimbursement as company funds. Report expenditures in the period for which they are incurred. Do not include the actual reimbursement.

Item 3A – PERFORMED WITHIN THE COMPANY

► Types of R&D Costs

Include as R&D costs:

- Wages, salaries, and related costs
- Materials and supplies consumed
- R&D depreciation
- Cost of computer software used in R&D activities
- Utilities, such as telephone, telex, electricity, water, and gas
- Travel costs and professional dues
- Property taxes and other taxes (except income taxes) incurred on account of the R&D organization or the facilities they use
- Insurance expenses
- Maintenance and repair, including maintenance of buildings and grounds
- Company overhead including: personnel, accounting, procurement and inventory, and salaries of research executives not on the payroll of the R&D organization

Exclude as R&D costs:

- Capital expenditures
- Patent expenses
- Income taxes and interest
- R&D performed abroad (see Item 3C), such as in Canada and Puerto Rico
- R&D performed by non-company R&D organizations of any kind (see Item 3B)

- Portion of company-held R&D contracts that are subcontracted outside the reporting company (see Item 3B)
- Fellowships, grants, and gifts to promote R&D or the study of science and engineering

Item 3A.1 – Basic Research

Include the cost of research projects which represent original investigation for the advancement of scientific knowledge and which do not have specific immediate commercial objectives, although they may be in the fields of present or potential interest to the reporting company.

If your company performs no basic research, please check the box in item 3A.1 and report zeros in line 1, columns 4, 5, and 6.

Item 3A.2a – Applied Research

Include the cost of research projects which represent investigation in discovery of new scientific knowledge and which have specific commercial objectives with respect to either products or processes.

Item 3A.2b – Development

Include the cost of projects which represent technical activity concerned with non-routine problems encountered in translating research into products or processes.

Include:

- Software development
- Design and operation of pilot plants and semi-work plants
- Engineering activity required to advance the design of a product or process so it meets specific functional and economic requirements
- Design, construction, and testing of prototypes and models including test models for defense contracts
- Designs for special manufacturing equipment and tools
- Preparation of reports, drawings, formulas, specifications, standard practice instructions, or operating manuals

Exclude:

- Routine technical services to customers
- Toolmaking and tool tryout
- Production of detailed construction drawings and manufacturing blueprints
- Pre-production planning

ITEM BY ITEM INSTRUCTIONS – Continued

Item 3A.2c – Total Costs for Applied Research and Development

Add line 3A.2a and line 3A.2b.

Item 3A.3 – Total Costs for Basic and Applied Research and Development Performed Within the Company

Add line 3A.1 and line 3A.2c.

► Estimating basic, applied, and development expenditures

If your company does not keep records that can be allocated to these specific categories, estimate by the following:

1. Isolate projects that clearly fall into the development category of R&D costs. If your company fabricates products, development activity will include the design, construction, and testing of prototypes and models. If your company's R&D involves the development of a "process" as in chemicals and petroleum, this development activity would primarily include the design and operation of pilot plants or semi-work plants.
2. Isolate the organizational units which have R&D activities that can be readily classified based on the function assigned to the unit. R&D work performed in production units as well as in various laboratories is generally classified as development R&D.
3. Distribute the balance of R&D costs on the basis of individual projects or on the basis of other summaries of the work.

Item 3B – OUTSIDE THE COMPANY

Report payments in the form of contracts, grants, and fellowships made to other industrial firms, commercial laboratories, consultants, educational institutions, hospitals, and research institutions or other organizations.

Federal Funds (column 4): Report R&D activities that your company subcontracted to other organizations using **federal funds** you received for R&D contracts and R&D portions of procurement contracts.

Company and Other Funds (column 5): Report R&D activities that your company subcontracted to other organizations using **company or other nonfederal funds**.

Item 3C – FOREIGN

Report the amount of R&D financed by the U.S. parent or its foreign subsidiaries, including Canada and Puerto Rico, and performed by company R&D laboratories, branch plants, or other organizations, located outside the United States. Foreign subsidiaries are those outside the 50 States and the District of Columbia.

Exclude R&D activities performed by foreign subsidiaries which were financed by foreign governments or other outside organizations.

Item 3D – TOTAL

With the exception of "Other funds," this number represents company-sponsored R&D. It is comparable to information reported on Form 10K, if you report to the Securities and Exchange Commission.

Add line 3A.3 (column 5), line 3B (column 5), and line 3C.

Item 4 – COMPANY AND OTHER FUNDS, EXCEPT FEDERAL, FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BUDGETED FOR THE YEAR 1998

Report the estimated cost of company and other nonfederally sponsored R&D that will be performed within the 50 states and the District of Columbia in 1998. This item is comparable to the 1997 figure reported in Item 3A.3, column 5.

Section II – RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE DOMESTIC COMPANY

Item 5 – COSTS INCURRED FOR FEDERAL RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY PRINCIPAL GOVERNMENT AGENCY

Distribute the cost of Federal research and development work (Item 3A, line 3, columns 1 and 4) by Federal agency – If exact figures are not available by agency, please estimate or apportion according to the number of scientists and engineers working on the Federal projects and/or the costs of Federal programs.

Item 6 – COSTS INCURRED FOR RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY MAJOR TYPE OF EXPENSE

If most R&D is performed in units where summaries are regularly prepared by element of cost, base the breakdown of research and development costs upon the records of such units. If existing records do not yield figures for this item, the item may be estimated.

Item 6.1 – Wages and Salaries

Report the gross earnings paid in calendar year 1995 to employees engaged in R&D (follow the definition of salaries and wages that is used for calculating the withholding tax). Include salaries of officers in the research establishment(s) if a corporation; exclude payments to proprietor or partners if an unincorporated concern. (Scientists and engineers are defined in item 2.) Exclude employee fringe benefits which are to be reported in Item 6.3 – Other costs.

ITEM BY ITEM INSTRUCTIONS – Continued

Item 6.2 – Materials and Supplies

Report the delivered cost for all purchased materials consumed, whether received from other companies, withdrawn from inventory, or received from other establishments of this company. Include all work that was done for your laboratories and other technical units by non-company organizations (for example, model construction by a non-company model shop). Exclude purchases from other R&D organizations.

Item 6.3 – Other Costs

Include items related to your R&D activities and not included in Items 6.1 and 6.2. Include utilities, books and periodicals, property and other taxes, employee fringe benefits, and company overhead.

Item 7 – FIELDS OF BASIC RESEARCH PERFORMED WITHIN THE COMPANY

Use the following definitions to help you divide your company's basic research into broad research fields.

Item 7.1– Chemistry

Includes inorganic, organo-metallic, organic, and physical.

Item 7.2 – Engineering (Including metallurgy)

Includes aeronautical (including aerospace and space technology), chemical, nuclear, civil, electrical, and mechanical engineering, etc.) and metallurgy and materials.

Item 7.3 – Geological Sciences

Includes geodesy, hydrology, geochemistry, seismology, soil sciences, etc.

Item 7.4 – Mathematics

Includes areas such as algebra; foundations and logic; geometry; numerical analysis, etc.

Item 7.5 – Computer Sciences

Includes activities directed toward enhancing the understanding of computer structures and computational processes to provide bases for the future capabilities for computational solutions of presently intractable problems.

Item 7.6 – Physics

Includes acoustics; atomic and molecular; condensed matter; elementary particle; nuclear structure; optics; plasma.

Item 7.7 – Astronomy

Includes laboratory astrophysics; optical astronomy; radio astronomy; theoretical astrophysics; Gamma-ray, neutrino astronomy.

Item 7.8 – Atmospheric Sciences

Includes aeronomy; solar; weather modification; extraterrestrial atmospheres; meteorology.

Item 7.9 – Oceanography

Includes biological oceanography; chemical oceanography; physical oceanography; marine geophysics.

Item 7.10 – Biological Sciences

Includes all sciences (other than clinical medical sciences) which deal with life processes, including plant and animal sciences, biochemistry, cell biology, nutrition, microbiology, physiology, etc.

Item 7.11– Clinical Medical Sciences

Includes all sciences concerned with the use of scientific knowledge for the identification, treatment, and cure of disease including internal medicine, neurology, preventive medicine and public health, pathology, pharmacology, psychiatry, dentistry, veterinary medicine, etc.

Item 7.12 – Other Sciences

To be used for multidisciplinary and interdisciplinary projects which cannot be classified within one of the above primary fields of science.

Item 7.13 – Total Basic Research Costs

This should be the same as Item 3.A.1., columns 3 and 6.

Item 8 – APPLIED RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY PRODUCT GROUP

Enter both Federal and total cost of applied R&D by product group. Costs should be entered in the field which is the END PRODUCT for the firm performing the R&D. For example, R&D in very large scale integrated (VLSI) circuits would be reported by a semiconductor firm on line 25, electrical industrial apparatus, if the chips are the final product sold by the firm. The same type of microelectronic R&D by a computer firm, however, would be reported on line 22, office, computing and accounting machines, if the chips are intended to be part of a computer which is the firm's end product.

Definitions for various fields of applied R&D are listed in the instructions for Items 8.1 through 8.37. For those companies familiar with the Standard Industrial Classification (SIC), the 1987 SIC codes are given after each title. Note that the SIC definition here applies to each field of R&D and effort, and not necessarily to the overall code in which your company's manufacturing output is classified.

Report cost of Federally funded applied R&D by product group in column 1, and total cost of applied R&D by product group (also including Federal) in column 2.

ITEM BY ITEM INSTRUCTIONS – Continued

How To Report Atomic Energy Devices:

- Radioactive isotopes and other radiation sources should be reported in line 8.5.
- Partially fabricated reactor fuel element materials and control rods should be reported in line 8.14.
- Nuclear reactors; reactor components and equipment; core structural; heat exchangers and condensers; valves; complete reactor fuel elements and control rods for use in propulsion, power plants, and other; and atomic waste casks should be reported in line 8.17.
- Fuel handling equipment, control rod drive mechanism and components for power plants, propulsion, and other; pressurizers, components, and auxiliary equipment; and pumps should be reported in line 8.23.
- Atom smashers (particle accelerators) should be reported in line 8.29.
- Accessory instrumentation for reactor control should be reported in line 8.34.
- Hot laboratory equipment and special instrumentation should be reported in line 8.35.

Item 8.1 – Food and Kindred Products (SIC 20)

Foods and beverages for human consumption and certain related products such as vegetable and animal fats and oils, and prepared feeds for animals and fowls.

Item 8.2 – Textile and Mill Products (SIC 22)

Mill preparation of fibers and mill manufacture of yarn, thread, twine etc; manufacture of broadwoven and knit.

Item 8.3 – Lumber and Wood Products (SIC 24)

Includes cutting timber and pulpwood: merchant sawmills, lath mills, shingle mills, cooperage stock mills, planing mills, and plywood mills and veneer mills engaged in producing lumber and wood basic materials; and establishments engaged in manufacturing finished articles made entirely or mainly of wood or related materials.

Item 8.4 – Paper and Allied Products (SIC 26)

Includes manufacturing of pulps from wood and other cellulose fibers, and from rags; the manufacture of paper and paperboard; and the manufacture of paper and paperboard into converted products, such as paper coated off the paper machine, paper bags, paper boxes, and envelopes. Also included are establishments primarily engaged in manufacturing bags of plastic film and sheet.

Item 8.5 – Industrial Inorganic and Organic Chemicals (SIC 281 and 286)

Includes alkalies and chlorine, industrial gases, inorganic pigments, and industrial inorganic chemicals not elsewhere classified (n.e.c.).

Also includes industrial organic chemicals including gum and wood chemicals, cyclic crudes, and cyclic intermediates, dyes, and organic pigments, and other industrial organic chemicals n.e.c. Includes radioactive isotopes and other radiation sources.

Item 8.6 – Plastics Materials and Synthetic Resins, Synthetic Rubber, Synthetic and Other Manmade Fibers (SIC 282)

Includes cellulosic and noncellulosic fibers. Excludes glass which should be included in product group 13.

Item 8.7 Drugs (SIC 283)

Medicinal chemicals, biological and botanical products, and pharmaceutical preparations.

Item 8.8 – Agricultural Chemicals (SIC 287)

Fertilizers, agricultural pesticides, and other agricultural chemicals.

Item 8.9 – All Other Chemicals (Balance of SIC 28)

Includes explosives, soaps, glycerins, detergents and cleaning preparations, paints and varnishes, toilet preparation, and miscellaneous chemical products.

Item 8.10 – Petroleum Refining and Related Industries, Oil and Gas Extraction (SIC 13 and 29)

Excludes geological and geophysical exploration activities.

Item 8.11 – Rubber and Miscellaneous Plastics Products (SIC 30)

Fabricated rubber such as industrial and mechanical rubber goods and fabricated plastics products.

Item 8.12 – Leather and Leather Products (SIC 31)

Includes tanning, currying, and finishing hides and skins, leather converters, and establishments manufacturing finished leather and artificial leather products and some similar products made of other materials.

Item 8.13 – Stone, Clay, Glass, and Concrete Products (SIC 32)

Ceramics, glass, clay products, abrasives and asbestos products, cement, stone products, concrete products, and other nonmetallic mineral products.

Item 8.14 – Primary Ferrous Products (SIC 331, 332, 3399, and 3462)

Products of blast furnaces, steel works, rolling and finishing mills, iron and steel castings and forgings. Includes partially fabricated reactor fuel element materials and control rods.

ITEM BY ITEM INSTRUCTIONS – Continued

Item 8.15 – Primary and Secondary Nonferrous Metals (Balance of SIC 33 and 346)

Primary and secondary smelting and refining of nonferrous metals, rolled, drawn, and extruded nonferrous metals products, castings and forgings.

Item 8.16 – Ordnance, Except Missiles (SIC 348, 3795)

Artillery, small arms, ammunition, tanks and parts, etc.

Item 8.17 – Fabricated Metal Products (SIC 34 Except 3462, 3463, and 348, Ferrous and Nonferrous Forgings, Ordnance)

Tinware, hand tools, nonelectric heating apparatus, fabricated structural metal products, metal stampings, fabricated wire products, etc., core structural (barrels, cans, boxes, plates, etc.); heat exchangers, steam and barometric condensers, and valves; and nuclear reactors, reactor components and equipment.

Item 8.18 – Engines and Turbines (SIC 351)

Steam engines, steam gas and hydraulic turbines, diesel and other internal combustion engines, n.e.c.

Item 8.19 – Farm and Garden Machinery and Equipment (SIC 352)

Farm machinery, including tractors for farm use.

Item 8.20 – Construction, Mining, and Materials Handling Machinery and Equipment (SIC 353)

Construction mining and oil field machinery and equipment, elevators, conveyors, hoists, industrial trucks, tractors, trailers, and stackers.

Item 8.21 – Metal working Machinery and Equipment (SIC 354)

Machine tools, dies, machine tool accessories, rolling mill machinery, power-driven hand-tools, and wire fabricating machinery and equipment.

Item 8.22 – Office, Computing, and Accounting Machines (SIC 357)

Electronic computing equipment; calculating and accounting machines; typewriters; other computing and office machines (except laboratory scales and balances).

Item 8.23 – Other Machinery, Except Electrical (Balance of SIC 35)

Special industrial machinery, except metalworking, such as food products machinery, textile and paper industries machinery, general industrial machinery and equipment, and miscellaneous machinery except electrical. Includes pumps, air and gas compressors, and industrial process furnaces and ovens. Includes atomic fuel holding equipment; control rod drive mechanism and components for use on nuclear reactors.

Item 8.24 – Electric Transmission and Distribution Equipment (SIC 361 and 3825)

Electric measuring instruments and test equipment power, distribution and specialty transformers, switchgear and switchboard transformers, etc.

Item 8.25 – Electrical Industrial Apparatus (SIC 362)

Electric motors and generators, motor starters and controls, carbon and graphite brushes, electrodes. Nonelectronic capacitors, condensers, and rectifiers.

Item 8.26 – Radio and Television Receiving Equipment, Except Communication Types (SIC 365)

Radio and television sets, home recorders, prerecorded magnetic tapes, microphones, speaker systems, turntables, phonograph records, compact disc players, etc.

Item 8.27 – Communications Equipment (SIC 366)

Telephone and telegraph apparatus, radio and television transmitting, signaling, and detection equipment and apparatus.

Item 8.28 – Electronic Components and Accessories (SIC 367)

Semiconductors, computer logic modules, computer chips, solid state electronic devices, integrated circuits, electronic capacitors, transformers, connectors, cathode ray tubes, solar cells, solid state photovoltaic devices, etc.

Item 8.29 – Other Electrical Machinery Equipment and Supplies (Balance of SIC 36)

Household appliances, electric lighting and wiring equipment, atom smashers, and miscellaneous electrical machinery, equipment and supplies.

Item 8.30 – Motor Vehicles and Equipment (SIC 371)

Motor vehicles such as ambulances, fire engines, personnel carriers, amphibian motor vehicles, truck and automobile trailers, and motor vehicle parts and accessories.

Item 8.31 – Aircraft and Parts (SIC 372)

Piloted and unpowered aircraft and parts of all types, including engines and auxiliary equipment such as landing gear, de-icing equipment, and other auxiliary equipment specifically adopted for aircraft. Exclude radar and radio equipment, electronic sighting devices and aeronautical instruments which should be reported in product group 32.

ITEM BY ITEM INSTRUCTIONS – Continued

Item 8.32 – Missiles and Space Vehicles (SIC 376)

Include frames or structures launching and handling support equipment and work on the missile system and space as a whole. Exclude electronic guidance control subassemblies and radar which should be reported in product group 35.

Item 8.33 – Other Transportation Equipment (Balance of SIC 37 Except 3795)

Ship building, boat building and repairing, railroad equipment, motorcycles, bicycles, and parts, etc. Exclude tanks and tank components which are in product group 16.

Item 8.34 – Scientific and Mechanical Measuring Instruments (SIC 381, 382 Part)

Engineering, laboratory, scientific, and research instruments, and associated equipment; automatic controls for regulating residential and commercial environments and appliances; industrial instruments for measurement, display, and control of process variables; nonelectric fire detecting systems, totalizing fluid meters and counting devices; instruments for measuring and testing electricity and electrical signals, and radar systems and equipment; accessory instrumentation for reactor control.

Item 8.35 – Optical, Surgical, Photographic, Timing and Other Instruments (Balance of SIC 38, SIC 382 Part)

Optical instruments and lenses; surgical and medical instruments and apparatus; dental equipment and supplies; ophthalmic goods including contact lenses; optical fire control equipment; photographic equipment and supplies including film and motion picture apparatus; watches, clocks, clockwork operated devices and parts, appliance timers, chronometers.

Item 8.36 – Computer Programming, Data Processing, and Other Computer Related Services (SIC 737)

Includes computer programming services, prepackaged software, computer integrated systems design, computer processing and data preparation and processing services, information retrieval services, computer facilities management services, computer rental and leasing, computer maintenance and repair.

Item 8.37 – Other

Please write-in the category.

Item 9 – COST OF RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY BY STATE

Report the cost of R&D for each State in which your company has research and development laboratories or facilities. It is not necessary to calculate separately individual assignments which may be made outside the home State of a particular research staff.

As much as 10 percent of the total may, if desired, be reported in line 52 as "Not distributed by State."

Item 10 – ENERGY RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY

Include all spending for R&D to increase energy resources or capabilities, including the development of energy equipment. Energy research and development can include costs of R&D projects (both product and process) on exploration, extraction, transportation, processing, storage, generation (including conversion), distribution, conservation, etc., of present, new, or improved forms of energy. Record energy R&D spending according to type of energy in Items 10A through 10E.

If R&D spending is for joint or multiple purposes, estimate and report the portion of cost incurred for the energy purpose. In the limited number of cases where the separation of joint (multiple) costs by type of energy cannot be estimate, include the total cost of the R&D project when the primary purpose of the project is energy research and development. If the project is not primarily for energy research and development then exclude all of the project cost.

Item 1 0B4 – Coal

"Synthetic fuels" includes programs designed to convert coal to gaseous and liquid products. "Mining" is composed of programs for developing equipment and techniques to improve the productivity and recovery rates of coal mining.

Item 10C3 – Conservation and Utilization

Includes R&D activities undertaken to reduce consumption either at the point of energy use or in the transmission, transportation, storage, and conversion of energy. Examples of such are R&D undertaken primarily to reduce fuel consumption in manufacturing, to improve the efficiency of transportation of energy products, or to produce an end product which is more efficient in energy consumption.

Item 10D – All Other Energy

Includes areas such as wind, waste, hydroelectric, etc. Also include in this category the development of energy equipment which cannot be readily classified in Items 10A through 10C.

Item II- POLLUTION ABATEMENT RESEARCH AND DEVELOPMENT PERFORMED WITHIN THE COMPANY

Includes R&D spending for the purpose of reducing or eliminating the emission of pollutants. "Pollution" refers to the emission of pollutants to the outside of a firm's property or activities; "abatement" includes prevention, treatment, or recycling.

Exclude costs:

- to contribute to environmental aesthetics
- to increase equipment durability in corrosive environments
- to conserve energy (include as energy R&D in item 5.3.)
- to conserve natural resources
- to increase employee comfort, safety, and health

ITEM BY ITEM INSTRUCTIONS - Continued

If the only purpose of the R&D spending is pollution abatement, include the total expenditures on the project. If pollution abatement is only one of several purposes, report only the R&D costs associated with pollution abatement. When the separation of joint costs is not feasible, include the total R&D costs for a project if the purpose is primarily (more than 50 percent) for pollution abatement.

If the project is not primarily for pollution abatement purposes, exclude all of the project costs. Also exclude project costs if expected pollution abatement benefits are obtained at no extra cost.

Item 11A - Air

1. Automotive emissions includes all R&D efforts undertaken to reduce exhaust emissions from automobiles.
2. Electric power plants emissions includes efforts directed toward reducing airborne emissions from electric power plants.
3. "All other" includes efforts directed at removing sulfur oxide, nitrogen oxides and particulates, and other fossil-fuel pollutants from the atmosphere.

Item 11B - Water

Includes R&D spending on water recirculation or thermal pollution abatement, etc.

Item 11C - Solid Waste

Includes R&D spending on waste compacting devices, etc.

Item 11D - Other

Includes R&D spending on pollution abatement from noise and radiation, etc.

Section III - RESEARCH AND DEVELOPMENT PERFORMED OUTSIDE THE DOMESTIC COMPANY WITH COMPANY FUNDS

This section of the report form covers the R&D reported in item 3.C of section I, on page one.

Item 12 - FOREIGN RESEARCH AND DEVELOPMENT BY COUNTRY

Allocate the totals reported in Item 3.C., column 5 by the country in which your various research and development takes place. Estimate the costs associated with each country. If necessary, you may write in countries not listed.

Item 13 - COVERAGE AND OPERATIONAL STATUS

Item 13A

Check the appropriate box if the domestic company expenditures on this form, including all subsidiaries, have R&D. If no, please explain in remarks section or in a transmittal letter.

Item 13B

Provide the name and address of the new owner. In the "Remarks" section, specify change or correction, e.g., wholly-owned subsidiary of ABC Company, "merger with XYZ Company", "acquired by 123 Corporation".

Item 14 - CERTIFICATION

Report the name and telephone number of the person to contact regarding this report. Please sign and date the form.

If you wish to correspond by E-mail, please provide your E-mail address in the "Remarks" section.

WARNING CONCERNING ELECTRONIC MAIL -

The Internet is NOT a secure means of transmitting information unless it is encrypted. If you choose to communicate with the Census Bureau via electronic mail, the Census Bureau cannot guarantee the privacy of the information while transmitted, but will safeguard it in accordance with Title 13. Be advised that making inquiries regarding this survey via electronic mail may divulge your participation in this survey.